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"Filter Apparatus"
V1012/20026

Description

[0001] The invention concerns a filter apparatus in accord with the generic concept of Claim 1.

[0002] DE PS 41 03 505 discloses a filter apparatus. This apparatus possesses a radial-flow, ring-shaped filter rotatably secured in a housing, wherein the housing has an opening for raw fluid feed and an opening for outflow. The ring filter is cleaned by a scraper blade, which is immovably set in place. Upon the turning of the ring filter, the sludge on the outside of the same can be removed.

[0003] The disadvantage of such an arrangement is to be found in that a mechanical action on the exposed surface of the ring filter, i.e. the filter element, is required. This leads to a situation, in which the results of scraping are deleterious to the function of the filter element. This also leads immediately to a force effect on the filtered-out sludge particles, which, under certain circumstances, can cause compaction of the sludge and caking in the pores of the filter element. On this account, the effectiveness of the filtering surface is substantially lessened.

[0004] Thus the invention has the purpose, to avoid the said disadvantage and to create a filter element, which can be cleaned at a high efficiency and without the intervention of a mechanical operation.

[0005] This purpose will be achieved by the said concept of Claim 1 and the characterized features thereof.

[0006] The essential advantage of the invention is found in, that in the case of an added backwash, as it is conventionally put to use, a scraper is not necessary. With the backwash, the appropriate control of the valving placed on the filter assembly allows filter-cleaning to take place solely through the hydrodynamic action of the medium to be filtered.

Upon the closure of the valves at the raw fluid inlet (raw side) and at the filtrate (clean side) outlet, because of the reduction of pressure, in the filtrate zone in comparison to the pressure at the sludge outlet, because of the dropping of pressure in the clean-filtrate space, the result is, that clean filtrate now flows into the space of the raw fluid and in doing so, dislodges the sludge particles adhering to the filter element.

[0007] In accord with one embodiment of the invention, the opening and closing of the valves occur as impulses.

[0008] The filter element, in the case of another embodiment of the invention, is proposed to be provided with filter film having slits.

[0009] Obviously, there is always the possibility of employing different filter mediums. In each case, a periodic cleaning of the slits, i.e. openings, by means of an appropriate valve control, remains necessary.

[0010] These and further features of preferred developments of the invention are available, besides from the claims, also from the description and the drawings whereby the individual features, whether self-supporting or together in the form of subcombinations according to the embodiment of the invention or as made valid and advantageous by use in other areas, for which protectable embodiments can be presented, and for which protection is claimed here.

[0011] The invention, in the following, will be more fully explained with the aid of an embodiment.

[0012] The Figure (1/1) shows a filter apparatus in a sectional view.

[0013] The filter apparatus is comprised of a housing 10, which is closed by a cover 12. This cover is penetrated by an opening 12, through which the filtrate can flow out through piping 13. The raw fluid enters from the line 14 into the raw fluid space 15 of the filter apparatus. The line 14 is provided with a valve 16 for its opening/closing. At the bottom of the housing 10 is located an outlet 17 for the sludge 18 which accumulates there. This opening, likewise, is provided with a valve 19.

The incoming raw fluid flowing through the line 14 distributes itself in the raw fluid space 15, flows from there through a hollow cylindrical filter element 20 and exits the filter apparatus, in a clean state, by means of the opening 12.

[0014] Filtered out sludge accumulates on the outer surface of the hollow, cylindrical filter element 20 and from time to time, this must be removed. For this purpose, acting in an pulsing manner, valves 16, 24 are closed and valve 19 opened. Because of the fluid pressure in the clean (i.e. filtrate) fluid chamber 21, as the dirty side pressure is released, a reverse flow occurs. That is, the clean filtrate now flows through the filter element in the direction of the raw fluid space 15 and dislodges the adhering sludge on the surface of the filter element and carries the dislodged sludge out through the exit opening 17. Because of gravity pull, the sludge collects on the bottom of the housing 10, and upon the next opening of the valve 19, the sludge is carried away.

[0015] The valves 16, 19, 24 can be placed on a common shaft, but also can be activated individually by means of an appropriate control unit.

Claims

Claimed is:

1. A filter apparatus with a radially through-flow, hollow, cylindrical filter element placed in a closed housing, said housing having an opening for the entry of the fluid to be filtered, and an opening for the removal of the filtered-out medium (sludge) as well as an opening for the out-flow of the filtrate, therein characterized, in that the feed pipe (14) for the entry of the fluid to be filtered and the discharge pipe (17) for the removal of the sludge as well as an outlet pipe 13 for the exit of the clean filtrate are each provided, respectively, with a valve (16, 19, 24), and when the valve 19 for the removal of the sludge is opened, and at the same time the valves (16, 24) are closed, a backflow through the filter apparatus occurs.

2. A filter apparatus in accord with Claim 1, therein characterized, in that the valve (19) is only opened when the other valves (16, 24) are fully closed.

3. A filter apparatus in accord with one of the foregoing claims, therein characterized, in that pressure sensors are provided, which deliver signals which can be evaluated by a control unit.

4. A filter apparatus in accord with one of the foregoing claims, therein characterized, in that at least one additional filter apparatus is connected in parallel and operates either simultaneously or in a time-delay phase manner.

Summary

Described is a filter apparatus possessing a hollow, cylindrical filter element 20 enclosed in a closed housing 10. On the housing is an opening for the in-feed pipe 14 of the medium to be filtered and an opening 17 for the removal of the filtered-out material. Also an opening 12 is provided for the discharge of the filtrate. The said openings possess respectively a valve 16, 19, 24. The cleaning of the filter apparatus is carried out in such a manner, that valves 16 and 24 are closed and valve 19 is open. The pressure drop in raw fluid chamber 15, caused by the opening of vale 19, produces a backwash pulse through the filter medium.

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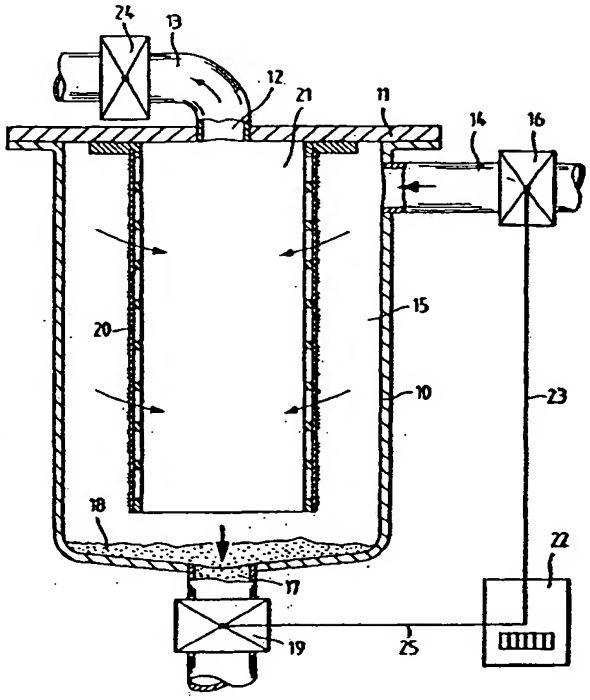
(54) Filtereinrichtung

(57) Es wird eine Filtereinrichtung mit einem in einem geschlossenen Gehäuse 10 angeordneten, radial durchströmbaren, hohlzylindrischen Filterelement 20 beschrieben. Am Gehäuse ist eine Öffnung zur Zuführung des zu filternden Mediums und eine Öffnung 12 zur Entnahme des gefilterten Mediums, sowie eine Öffnung 17 zur Entnahme des Filtrats vorgesehen. Die genannten Öffnungenb weisen jeweils ein Ventil 16, 19, 24 auf. Die Abreinigung der Filtereinrichtung erfolgt dadurch, daß Ventil 24 und 16 geschlossen werden und Ventil 19 geöffnet wird. Der Druckabbau über das Ventil 19 erzeugt einen Rückspülimpuls im Filtermedium.



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gleichzeitig das Ventil (16, 24) geschlossen ist

2. Filtereinrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das Ventil (19) erst öffnet wenn das weitere Ventil (16, 24) sicher geschlossen ist.

3. Filtereinrichtung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, daß** Druckaufnehmer vorgesehen sind, welche auswertbare Signale an eine Steuereinheit liefern.

4. Filtereinrichtung nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, daß** wenigstens eine weitere Filtereinrichtung parallel geschaltet ist und gleichzeitig oder Phasenverschoben arbeitet.

Europäisches Patentamt

EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 98 11 8683

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (Int.Cl.6)
X	US 3 414 129 A (GOING LOUIS H ET AL) 3. Dezember 1968 * das ganze Dokument *	1-3	B01D29/15 B01D29/60 B01D29/66
X	US 3 519 133 A (BROERING ROGER F) 7. Juli 1970 * das ganze Dokument *	1,2,4	
X	GB 112 159 A (WILLIAM BOBY) 24. Dezember 1917 * das ganze Dokument *	1,2	

RECHERCHIERTE SACHGEBIETE (Int.Cl.6)

B01D

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
DEN HAAG	3. März 1999	De Paepe, P

KATEGORIE DER GENANNTEN DOKUMENTE

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